

University of Strathclyde
Department of Educational and Professional Studies

**An investigation of the issues
surrounding the development of a software initiative**

by
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Abstract

An investigation of the issues surrounding the development of a software initiative

This study examines the issues raised by the introduction of a small-scale software initiative and its early use as an intervention strategy for pupils with literacy difficulties in four primary schools. The English language version of Lexion software was released in May 2006 and our local authority microtechnology team was the first in Scotland to obtain licensed copies. Therefore, it was important to plan and implement a trial to enable a consideration of the program's potential as a support strategy for learning and teaching. The study focuses on the experiences of fourteen pupils, from primary three to primary seven, who were referred to the microtechnology team for ASN/ICT assessment. The initiative involved using Lexion software as an assessment tool and support strategy for these fourteen pupils during a ten-week trial period. The intention of the study was to consider what could be learned from this trial and how this knowledge could inform future practice within the microtechnology team.

The study draws on a range of qualitative data, including pupil and classroom assistant interviews and class teacher and management surveys. The data indicates that benefits were recognised and concerns were identified. All fourteen pupils claimed to enjoy using the program and believed that it could also help other pupils. Most of them recognised that using the program was helping them in at least one area of skill development. The eight class teachers, five classroom assistants and four management respondents recognised benefits relating to assessment, customised activities for individual learners and the availability of additional strategies to support individual pupils offered by the program. They also identified a range of concerns relating to the need for staff training, hardware issues, management of support staff, time and the use of the software program.

The study recommends that the local authority and school management teams need to recognise and address the identified practical difficulties to enable the successful introduction of this software in other schools.

Although this was a small-scale study it identified significant issues that the microtechnology team need to consider if the initiative is to be expanded successfully. Such information is useful and will enable our team to continue to plan for a wider implementation and fuller exploration of the wider scope of Lexion software.

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Study Title

An investigation of the issues surrounding the development of a software initiative

1.1 Background

Our local authority's (LA) current Strategy for Inclusion Policy includes an Information and Communication Technology (ICT) Strategy. This states that one of the key benefits of ICT is to support teachers to differentiate the curriculum to meet the needs of individual learners. It indicates that the LA's computer centre has worked in partnership with its inclusion base to develop schools' use of software systems such as 'Successmaker', which can provide users with individually tailored work programmes. For pupils who require higher levels of support it recommends referral to psychological services and/or the microtechnology team for assessment and the identification of appropriate hardware and/or software to support access to the curriculum. I am one of 3 Additional Support Needs (ASN) / ICT teachers who form the microtechnology team.

Remit for Microtechnology Team

To use assistive technology

- to assess individual needs
- to enable access to the curriculum
- to identify appropriate equipment and software
- to provide staff training
- to support inclusion
- to contribute to learning and teaching

Referrals

There are 127 primary, 25 secondary and 11 special schools within the local authority. Although any teacher can refer a pupil, group or class, most referrals come from educational psychologists, headteachers in primary and special schools and support for learning principal teachers in secondary schools. Reasons for referral in order of frequency in the previous academic year:

- literacy difficulties
- communication difficulties
- physical disabilities
- sensory impairments
- medical / health problems

Following our team's discussion of various official reports, information from appropriate texts, internet research and recommendations from other practitioners in the ASN/ICT field, the following checklist was devised by us to help identify features of supportive software for our service.

Supportive Software

- allows for differentiation
- enables a multi-sensory approach
- can be customised for users
- allows for the creation of additional content by teacher
- supports cross curricular activities

1.2 Professional Rationale

The increasing number of referrals for literacy difficulties has focussed our team's attention on the need to recognise not only the range of difficulties encountered but the diverse nature of the available software programs. Submitted assessment request forms often indicate that the referred pupil has general reading problems or spelling difficulties and it can often be a challenge to identify specific software support strategies for individual learners. Therefore, diagnostic assessment plays a major role in exploring an individual's current progress and examining their learning strategies.

A wide range of software programs is available to support the development of literacy skills: phonics, phonological awareness, auditory memory, decoding, comprehension, spelling, and writing. However, a recently available English language version of Lexion, a Swedish software product, appears to offer both assessment and intervention opportunities. The developers claim that this program offers teachers and speech and language therapists a highly personalised intervention strategy for pupils who have specific language and literacy needs. In addition, it allows pupils to follow individual routes to the development of key skills, which not only support them but also help them recognise their own progress. Key features of the program include assessment, individual user interface, range and level of activities and customisation facilities.

In March 2006 our team members explored this program and discussed its potential for our service. It appeared to offer so much and to cover a wide range of skills and levels of development. However, the practical application of the program in a school setting had to be planned. Permission to undertake a standardisation exercise on behalf of the developers was sought from the headteacher, staff and parents of a primary school. In May 2006 I conducted a standardisation exercise where 2 randomly chosen pupils from stages P2 to P7 in the targeted primary school completed the full set of Lexion assessment activities for their age group. The pupil

results from this exercise were then sent to the developers. This was a useful personal experience because it allowed me to become more familiar with the activation of the assessment at different levels and the types of information generated by the program. Furthermore, I decided to collect pupil responses about the various assessment activities after they had completed each one and teacher reactions to the type of information given about pupil performance. Pupils' overall reactions to the whole assessment experience were very positive, while teachers seemed impressed by the amount and range of data produced. This additional information was presented at a team meeting.

In August 2006 this school identified and referred 2 P5 pupils who continued to experience significant reading difficulties and had not responded to a range of interventions introduced since P2. Lexion assessment was requested and these pupils started to work on a series of activities created by the program following assessment. This experience was particularly useful as it involved making adaptations to some of the activities to make them more supportive for these two pupils. Thus, an early indication of a slight mismatch between some of the levels of activities generated by the program and the ability of the assessed pupils was noted. This increased the need to explore further the application of the program in real learning contexts.

In response to the increasing number of referrals for literacy support my principal teacher encouraged me to undertake this project as it could give us greater insight into the range of support features within Lexion, its impact on learning and the identification of issues surrounding its implementation in a range of school settings. The completed report and any supportive evidence will also be a factor in our team's decision on whether or not to proceed with the active promotion of this software intervention.

Therefore, the focus of this project will be on the issues surrounding the introduction of Lexion as a targeted intervention strategy between March and May 2007 in four primary schools.

1.3 Aim of the Study

To analyse the issues raised by the introduction of a small scale software initiative and its early use as an intervention strategy for pupils with literacy difficulties.

Research Questions

- Which aspects of the pupils' learning are supported by the software?
- What benefits are recognised by pupils and staff?
- What concerns are expressed by pupils and staff?
- Which issues need to be addressed if the initiative is to be expanded successfully?

Chapter 2 Literature Search

2.1 Introduction

As the English language version of Lexion was only developed in 2005 and did not become commercially available until May 2006, it has not been possible to find critical research about this specific software title. Although the original Swedish version of Lexion was developed 18 years ago and has undergone several revisions, attempts to access critical research of this product have also been unsuccessful. Contact with the developers themselves reveals that they are currently unaware of any independent research involving their product. The only available material comes from testimonials issued by the publishers and promotional material from the marketing companies. Therefore, the literature will focus on several key themes which are relevant to the research aim and questions: literacy development, learning approaches, computer assisted learning (CAL) and features of Integrated Learning Systems (ILS).

2.2 Literacy

Although there has been a great deal of research into the development of literacy skills, no definitive method has emerged for the teaching of reading. However, it is recognised that learning to read involves a set of complex processes that can go wrong in different ways and for different reasons. Furthermore, Hay et al (2005) claim that there is research consensus that reading difficulties impact on:

- literacy demands across the curriculum
- levels of motivation
- academic self-concept
- self-esteem

This is supported by Fisher's observation that the greatest barrier to learning beyond the earliest stages is "fear of failure."(1995) Therefore, pupils who are still learning to read while their peers are using their reading skills to help them learn face major disadvantages.

2.3 Learning Approaches

Different theoretical perspectives offer a range of models to consider when assessing features of Lexion's design, such as presentation of activities and anticipated pupil response. Social Constructivist theory offers insights into how individuals learn. Key ideas within this paradigm include the impact of the social environment and the cultural context on individual development (Vygotsky,1962). Vygotsky also

identified some problems facing learners, including concepts relating to motivation and thinking processes. An important concept for Vygotsky was the Zone of Proximal Development, a hypothetical construct to indicate the gap between what an individual knows and what they can potentially achieve if given appropriate help by someone more knowledgeable. This raises the issue of whether or not technology can fill the role of the learning partner. Some of Vygotsky's concepts, such as scaffolding and modelling as strategies to enhance learning, are also interesting to consider when evaluating this particular software. Bruner's (1987) idea of learning as both an active and a problem solving process and his concept of the spiral curriculum are also useful in this context. Bruner claimed that individual learners should be challenged by being exposed to ideas which they may only be able to grasp at an intuitive level, but which could be revisited at progressively more complex levels of understanding over time. This would seem to suggest that while pupil use of multimedia resources will reflect their current levels of understanding and motivation, these are not static. Lexion also includes facilities to create increased levels of challenge.

However, although Social Constructivists can offer helpful ideas about the development of all learners, limitations can be identified because intrinsic motivation of learners is assumed and the reality for many struggling readers can be very different. Therefore, consideration of some ideas from within psychology and cognitive science are useful. Key psychological conditions for learning identified by Kyriacou,(2001) including attentiveness, receptiveness and appropriateness, support the intention to present a software intervention to pupils who have previously experienced a range of alternative strategies. Additionally, Flavell's (1985) concept of production deficiency as an explanation for many learning difficulties is thought provoking. Failure to learn in this view is caused by a lack of awareness of more helpful cognitive strategies to use. Learners need information about a range of strategies in order to improve their own performance. Technology can be used to provide an alternative approach for many learners and expose them to a range of alternative challenges.

Another interesting learning theory is outlined by Smith (1996) with his identification of visual, auditory and kinaesthetic learners as a way of explaining how individuals learn best. Elements of this theory can be accommodated by many multimedia software titles, including Lexion. Further insight into motivational factors comes from claims that intrinsic motivation is promoted by enjoyment, accomplishment or an increased sense of learning experienced by an individual (Lepper, 1988). Again, for some learners it can be claimed that the use of ICT increases levels of motivation.

Additionally, there is evidence to show that if pupils' views about their own learning experiences and preferences are consulted and acted upon then this can lead to improved performance (Gray et al, 1999).

By contrast, some aspects of Lexion demonstrate a task analytic approach by assuming that constituent parts can be identified in reading processes. Further assumptions indicate that a linear sequence can be recognised and teaching methods can be adapted to ensure that each sub target is achieved within each learning outcome. The key danger in this approach is that resources, rather than individual needs, may become the priority. Watson (1996) argues strongly that task analytic approaches are at odds with the social constructivists' view that "learning does not automatically result from teaching, however skilfully organised and with however much appropriate repetition and reinforcement."(p72) Additionally, Solity (1992) labelled close concern with observable learning outcomes "a naïve collection of behavioural evidence" (p28) which, he claims, cannot demonstrate true learning. Goddard (1997) also warned that education is more than a succession of hurdles to be systematically cleared and criticised any educational objectives model on the grounds that it is reductionist to believe that making the steps smaller will solve all the difficulties experienced by learners. These ideas present interesting challenges to the software's design. However, there is some evidence of support for task analytic approaches from Deponio, Landon and Reid (2000) and McCarthy (2004) who identify some of its strengths when supporting learners with literacy difficulties. These benefits include:

- consistent and predictable routines and demands
- opportunities for additional practice
- multi-sensory approaches
- over-learning but in meaningful contexts

2.4 Computers and Education

It has been claimed that the use of computers has the potential to encourage many learners. Further benefits outlined by Schofield (1995) include ICT as a source of challenge and motivation and as a promoter of self-confidence. Thus, it is apparent that ICT has a lot to offer in terms of both curricular support and pedagogy. Other benefits of ICT operate at the level of individual learners and their learning processes. Scrimshaw (1997) contends that the use of open-ended or tool software packages can encourage individual learners to explore and experiment. This develops the individual's awareness of learning as an active process. Consequently, this can enhance cognitive development by encouraging independent working and providing problem-solving opportunities.

Interaction with the computer can also benefit pupils by giving them a sense of control and choice over pace and resource. The use of a computer as a dialogue partner can also provide opportunities for cognitive apprenticeship through the use of ILS where the learner can experience what Collins et al (1998) refer to as modelling, coaching and fade-out. These three phases it is claimed can reduce the fear of learning which some learners experience and build self-esteem. However, although ILS such as Plato and Successmaker do not share the same approaches, it is possible

to identify elements of Skinner's stimulus response theory in both. Furthermore, there are concerns about the way ILS are used in some schools where those with additional support needs are identified as the sole users of these systems, when in fact these systems can accommodate all pupils. Concomitant negative effects on self-esteem and levels of motivation were identified by Leask & Pachler, (1999).

Research into the use of ILS has shown that there is no clear evidence that it is effective in improving literacy levels. Brooks' meta-analysis of literacy interventions stated that the main result of ILS research was that its impact on reading was non-significant. Lewis's (1999) review of the literature on using ILS with children with reading difficulties also claimed that there were no proven benefits. Although Underwood (2002) did find that there were improvements for pupils using an intensive sub skills tutoring approach it was suggested that other strategies might have produced the same results if followed as rigorously. Nevertheless, computer based learning systems continue to be developed.

2.5 Implementation Issues

Further research into the use of ILS in schools (Van Dusen & Worthen, 1993) highlighted issues related to successful implementation and management of such systems. Identified features which contributed to successful use of ILS included:

- time user spends with system
- level of class teacher involvement
- curriculum relevance
- staff development

Additional issues identified (Parr, 2000) included :

- the quality of the available hardware
- the need to create a comfortable learning situation
- the importance of personnel to ensure optimum use of the software
- the importance of selection, placement and tailoring program to address needs
- the development of appropriate organisational systems within the school

2.6 Features of Lexion

Although this program depends on teacher intervention and does not automatically adjust the level of challenge according to pupil performance, some of the research findings associated with ILS can also be useful when considering its content. Kemp (1997) found that software which gave pupils some control over the amount of the activity resulted in higher achievement and better attitudes towards learning. Tiered scaffolding of instructional support and the use of still graphics improve levels of pupil interest according to Lewis (1999). Hibbing and Rankin-Erickson (2003) found that those who struggle to decode can be helped by strategic use of external images

to support their comprehension. Their recommendation of simple teacher-drawn illustrations or pupil drawings fits well with the simple graphics displayed by the program. However, Chandler (1995) warns that repetitive visual text and accompanying auditory support might impose an extraneous cognitive load on the user's working memory.

Although certain program features appear to adopt a behaviourist training approach, support for Lexion's design comes from Hartley's (1998) identification of four key principles if such behaviourist models are to be effective in promoting learning: active not passive learners; repetition; frequent practice and re-inforcement. The design of the Lexion program also avoids what Hurry (1996) has termed 'the butterfly approach or the smorgasbord approach', (p.26) either flitting unproductively from one item to another, or trying to digest too much all at once.

Therefore, the literature provides some support for many of the design features of the program while presenting some challenges to its potential effectiveness in terms of pupil achievement and concomitant improvement in transferable literacy skills.

Chapter 3 Methodology

3.1 Introduction

The aim of this study was to analyse the issues raised by the introduction of a small scale software initiative and its development as an intervention strategy. Aspects of the original research design were influenced by practical considerations including access to colleagues, time constraints and employment context. Initially, a set of three exploratory case studies on the use of Lexion software with 3 referred participants in 3 primary schools to be conducted during an 8 week period between January and March 2007 was planned. The focus of the proposed case studies was to be on three pupils with significant literacy difficulties who would use the program independently. However, early elements of process evaluation coupled with practical difficulties associated with these three users led to a clear recognition that the planned research design could not fully accommodate what was happening in the active research. Consequently, the revised approach adopted an action research model to include an exploratory study of the use of Lexion software with referred participants in four self-selected locations.

3.2 Research Design

Lexion software was recommended as an intervention strategy for a small number of pupils in four primary schools. The study focused on the experiences of fourteen identified pupils and relevant staff over a ten week period between March and May 2007 in four primary schools in one local authority area.

The schools varied in size:

- School 1 < 100 pupils
- School 2 < 150 pupils
- School 3 < 250 pupils
- School 4 < 350 pupils

Four schools were used in an attempt to provide a more balanced approach by minimising potential bias in the study emanating from factors such as management style, school policies and pupil population. However, the decision about whether the pupil users were given adult support was made at individual school management level.

The qualitative data collected for this study came from 4 sources:

- 14 interviews with pupils who had used Lexion
- 5 interviews with classroom assistants
- 8 class teacher questionnaire responses
- 4 management responses collected by e-mail request

It is intended that the revised design allows for some description of the implementation of this program and consideration of its early impact on the areas indicated in the research questions. Among the drawbacks will be the fact that only a small number of participants will be involved so it will not be possible to claim that their experiences are representative. Additionally, as some of the observations were collected retrospectively, some important information could have been overlooked. However, it is hoped that some degree of triangulation will be achieved as at least three perspectives were considered for each research question.

The initial design had included the use of quantitative data generated by the program and this would have been manageable given the use of three subjects. However, the reality of the number of computers being used and the problems experienced with the hardware in some settings made the collection of such data largely unreliable. The 10 week trial period also proved too short a time scale to consider re-testing the users to compare the before and after assessment results. This decision was taken after trying an assessment re-test with two pupils not included in the study. Both the P3 and the P6 pupil quickly indicated that they had done this test before.

3.3 Interviews

The decision to use interviews as a research tool was taken because of the flexibility they offer and the opportunities they present to encourage individuals to express their ideas further. It was also noted that their shared frame of reference made them particularly appropriate for the discussion of educational issues. (Drever, 1995)

The pupil interview schedule ([Appendix](#)) was designed to present a fixed set of questions with some opportunities to expand on several points and to add any comment they wished. It was hoped that this form of data collection might allow for the use of coding during analysis. Pupil questions were set to explore their use of the program, their opinions and thoughts. Initially, a questionnaire had been developed because of the time required to interview 14 individuals in four different sites but it was quickly recognised when formulating the questions that many of the users would have difficulty reading the text and/or writing a response.

By contrast, the classroom assistant interview schedule ([Appendix](#)) was designed to be semi-structured. This seemed a more appropriate tool when interviewing colleagues and was issued to participants in advance. There were no set questions, rather a set of headings to allow people to expand as they wished. However, some prompts were included if required. The decision to use a semi-structured interview was taken because it was recognised that this approach not only offered opportunities for respondents to express their opinions but also allowed the interviewer scope to probe for clarification or elaboration of ideas. Strength of feeling can also be conveyed and account taken of factors such as facial expression and tone of voice during an interview.

Among the disadvantages of this approach was the time required for the interviews and their later analysis. Other difficulties identified involved keeping interviewees focused on the key ideas of the schedule and trying to ensure that the probes were neutral and did not reflect any personal bias of the interviewer.

3.4 Questionnaires

The second strand of the research design involved the development of small scale surveys. This decision was influenced by the claim that questionnaires allow opportunities for both description and measurement (Hoinville & Jowell, 1987). Another attraction of this tool was Hakim's (1987) claim that questionnaires are both transparent and accountable. However, a possible disadvantage is recognised by some researchers who claim that there can be a discrepancy between what people do and what they claim. (Newcombe et al, 1991)

Two questionnaires were developed. (Appendices) The first was issued to those class teachers in each of the four schools who had pupils using the Lexion program. It explored teacher perceptions of pupils' difficulties, their experience of the intervention and their ideas about the Lexion program.

The key disadvantage of developing the teacher questionnaire was concern about the types of information which could be gathered. Quite a lot of thought went into the layout of this questionnaire in an attempt to gather both information and opinions. Teacher respondents were also encouraged to add other comments if they wished. As it was also important to aim for clarity and lack of ambiguity, the finished tool was tested by a colleague who was not part of the study.

The second included only two questions and was e-mailed to the headteachers of schools 1, 2 and 3 and the depute head teacher of school 4, as she had responsibility for the ASN and ICT remits within the school. The focus here was limited to benefits and concerns identified. The advantage of using the local authority intranet was that detailed responses could be gathered and respondents could take time to formulate their ideas and could reply when it was suitable for them.

3.5 Research Experience

The local authority education manager was informed that this software intervention had been planned and that a report would be produced. Individual meetings were arranged with the head teachers in the four schools to ask for permission to approach relevant staff, pupils and parents. A letter to the parents of all pupils included in the proposed research study was issued, including a tear off slip granting permission for inclusion if signed and returned. (Appendix)

The next step was to conduct appropriate assessment activities with each of the pupils. This was followed by brief meetings with each of the class teachers to present

the assessment results and discuss the teacher's areas of priority for the individual. From this discussion an intervention program delivered in 20 minute sessions three or four times weekly for ten weeks initially was developed. In each school some time was allocated to introduce the program to a number of classroom assistants who might be used to support pupil use of the program. Each head teacher was also informed about the planned work programs. The use and management of adult input to support the pupil users of the program was decided by each school.

During the ten weeks period of phase one of the research I was able to visit the four schools intermittently, mostly to manage pupil use of the program and alter levels of challenge and/or support, and remove or add activities based on the logbook records. On a number of occasions I also had further access to classroom assistants and was able to answer a number of questions related to the management of the program or technical issues.

During the second phase of the research I was able to conduct 9 pupil interviews in schools 1, 2 and 3, but the two classroom assistants in school 4 had to be approached and asked to interview the five pupils there, after discussion about the tone and style of the previous interviews. The class teachers were approached personally and asked if they would be willing to complete a questionnaire. A date for collection was agreed jointly if they agreed. Respondents were encouraged to add any comments they wished and assured of anonymity. The classroom assistants were also approached personally and, if they agreed, given an interview schedule. Interview times were arranged for the following week. The final step involved sending a request for ideas in two key areas to head teachers via the LA intranet.

During each stage of the process the assurance was given to all participants that all information received would be treated in confidence and that no statement would be attributed to named individuals. These courtesies were among those recommended by Bell (1997).

Chapter 4 **Presentation of Findings**

4.1 The Pupils' Perspective

Fourteen pupils, who had been referred to our service after being identified by their teachers as having significant literacy difficulties, were interviewed after a ten week trial period using Lexion software: the 11 boys and 3 girls were asked about their experience and for their opinions and thoughts about the program. The interviews were conducted during the first two weeks in June 2007. Each interview lasted between 10-15 minutes. For the purposes of data collection and content analysis each pupil was allocated an alphabetic tag.

Distribution of pupils (n=14)

	P3	P4	P5	P6	P7
School 1			a		
School 2		bcd		ef	
School 3			gh		i
School 4	jk			lm	n

Additional support mechanisms experienced by these pupils were identified by class teachers. It was important to note what additional strategies were being employed at the same time as the Lexion trial to recognise that they could also be a contributory factor when considering perceived improvements.

Direct tuition from SFL Teacher	8 pupils
SEN auxiliary support	3 pupils
Classroom assistant input	11 pupils
Speech and Language Therapist	3 pupils
Successmaker software	12 pupils

In all cases a request was made by the researcher for Lexion software to be substituted for successmaker software, if it was being used as an additional literacy intervention, but a number of these pupils continued to use successmaker as part of their maths work program.

The 12 pupils who had used successmaker to support literacy were asked to indicate their program preference and to explain their decision. Although it was recognised that length of use may have been a factor in the choices made, it was useful to note the key reasons identified for the preference expressed. One pupil, who preferred successmaker, indicated that he had been using this program for four years and so

felt more comfortable when using it. One pupil expressed no preference but claimed to like both programs equally. Key reasons given by the ten pupils who expressed a preference for Lexion were:

- fun factor
- greater challenge
- more varied activities

4.1.1 Pupil perception of improvement

All of the pupils interviewed claimed that they thought Lexion had helped them but it was interesting to identify their perceptions of how it helped. Many pupils identified more than one area of improvement, without any prompts being offered.

Improvements identified	Number of pupils	(n=14)
Language work	9	
Reading	4	
Spelling	4	
Thinking	3	
Other class work	2	
Concentration	2	
Listening	1	
Writing	1	
Grammar	1	
None	0	

Some of the areas identified may have been influenced by the activities offered to individual pupils by the program based on their particular assessment profile.

4.1.2 Perceived benefits for other users

All of the pupils believed that using Lexion could also help other people. Five of them indicated that others could benefit in the same ways as they had, in terms of improved literacy skills, but some pupils identified a separate set of features for other users. Of particular relevance in terms of the research questions were the claims that Lexion could help people “learn more”, that Lexion could help “depending on what they need” and finally the claim that “you don’t really know it’s learning because it is like a game.”

4.1.3 Mini Lexion

The Mini Lexion program offers the facility for Lexion activities to be practised in the pupil’s home. Nine of those interviewed indicated that they would like to be able to use Lexion at home while five would prefer to use it exclusively at school.

Key reasons for wishing to use Mini Lexion were:

- It's fun to do
- More time could be spent on the activities
- Parents could be involved

Key reasons for not wishing to use Mini Lexion were:

- It might reduce time for social activities
- Home situation not suitable
- Concern about increased levels of parental pressure

4.1.4 Other Comments

Pupils were offered the opportunity to add any comment and invited to include any negative ones about their experience with Lexion. Six pupils chose to add positive comments which highlighted the enjoyment factor. Two complaints were made about audio levels and the use of headphones but these external issues could be easily addressed. More importantly, for the purposes of the research questions, was the desire expressed by one pupil to be allowed to work independently and the fears expressed by two pupils about falling behind or missing class work while undertaking Lexion activities.

4.2 Class Teachers' Perspective

These findings were based on eight questionnaire returns from the class teachers of the fourteen pupils using Lexion. Most of the respondents included additional comments to complement the original questions.

4.2.1 Concerns expressed about pupil progress

Class teachers were asked to indicate the concerns they had about each of the referred pupils before they started to use Lexion.

Pupils

Area of Concern	a	b	c	d	e	f	g	h	i	j	k	l	m	n
Decoding	*				*		*	*	*	*	*	*		*
Spelling	*	*	*	*	*	*	*	*	*	*	*	*	*	*
Writing	*	*	*	*	*	*	*	*	*	*	*		*	*
Phonological Awareness	*		*	*	*		*	*	*	*	*	*		*
Comprehension	*		*	*	*	*	*	*		*	*			*
Memory	*	*				*	*	*		*				
Communication	*		*			*	*	*		*				
Attentiveness	*		*			*	*	*					*	
Motivation	*		*		*	*	*	*					*	
Behaviour													*	
Self esteem			*	*	*	*	*	*		*		*	*	*
Other (please specify)														

4.2.2 Perceived impact of software intervention

Class teachers were asked to indicate where they could provide evidence of improvement for the pupils at the end of the Lexion trial period.

Pupils

Evidence of Improvement	a	b	c	d	e	f	g	h	i	j	k	l	m	n
Decoding	*						*	*	*			*		
Spelling	*			*			*	*	*			*	*	
Writing	*						*	*	*		*	*	*	
Phonological Awareness	*						*	*	*	*		*	*	
Comprehension	*						*	*	*					
Memory	*						*	*						
Communication	*													
Attentiveness	*	*		*			*	*					*	
Motivation	*	*					*	*					*	
Behaviour													*	
Self esteem		*	*	*			*	*	*			*		*
Other (please specify)														

4.2.3 Perceived pupil reaction to Lexion trial

The teachers were asked to describe pupil reaction to using the program during the ten week trial period.

Seven respondents returned positive comments citing the following shared ideas about overall impact:

- increased pupil confidence
- improved self esteem
- independence

They also returned positive comments citing the following shared ideas about pupil's interaction with the program:

- found it motivational and worthwhile
- very positive and eager to complete activities
- go out to use the program willingly
- seem to enjoy using Lexion

One respondent commented that the two P3 pupils in her class were not as motivated at the end of the trial period as they had been at the start but still went to practise willingly.

4.2.4 Benefits identified for class teachers

- allows teachers to set up appropriate individual work programme for pupils
- pupils can work independently at their own pace and level
- useful reinforcement tool
- individuals can work on skills needed for other areas of the curriculum

4.2.5 Concerns raised by class teachers

The responses varied across the four schools. The four teachers in schools one and four registered no concerns. The concerns registered by the other four respondents all related to limited knowledge of the program and the need for training. When asked if they would welcome training or see it as an added pressure the eight respondents replied that they would welcome training and find it helpful.

4.2.6 Additional comments

An opportunity was given at the end of the questionnaire for individuals to add any other thoughts about the trial experience. The four extracts cited below are included as they offer further insight into elements of the program's impact and raise points which will be useful when addressing the research questions.

“I found Lexion a very worthwhile learning tool where children's specific learning needs are being targeted and progress can be made.”

“There has definitely been an improvement in the confidence and ability of the pupil who has been using Lexion. Obviously it must go hand in hand with the work being done in class.”

“I would like to see more children involved with it. I can think of several other pupils who would benefit from using it.”

“If successful, each child could access their own program in classes during language times, so that they could work to the class timetable along with their peers.”

4.3 Classroom Assistants' Perspective

Five classroom assistants were interviewed: one from school 1 and two each from schools 2 and 4. School 3 had decided that the three referred pupils could use Lexion independently, although one classroom assistant had been introduced to the program and shown how to access it with pupils. Each interview lasted between 25 – 30 minutes. Four of the interviewees had undergone brief induction training with the program but one (ca3) had become involved later due to personal interest, after working with pupil users in other curricular areas.

4.3.1 Experience with pupils using the program

School 1	one P5 pupil four times a week (ca1)
School 2	three P4 pupils three times a week (ca2) some input with two P6 pupils at class teacher direction (ca3)
School 4	two P3 pupils at least twice a week (ca4) two P6 pupils and one P7 pupil at least twice a week (ca5)

4.3.2 Observations about pupil motivation

Ca3 felt unable to comment because of her lack of structured involvement but the other respondents commented positively on the motivation of the users. Two commented that two of the pupils observed seemed comfortable using the program now but had needed some adult encouragement in the early stages of use.

4.3.4 Observations about pupil performance

Pupil likes range of activities (ca1)

I thought the levels sometimes inappropriate (ca2)

I thought the levels were too difficult for one of the pupils (ca3)

They are quite confident in using the program (ca4)

They are coping well on the whole. They are willing to give their opinion about the activities they are doing (ca5)

4.3.5. Levels of support

The support offered to pupils varied across the four schools.

In school 1 the classroom assistant was not initially timetabled to support the pupil but the pupil used the program in the room where the classroom assistant prepared materials and, as she supported the pupil daily in other ways, she gradually became involved. The head teacher then timetabled this involvement for each of the four twenty minute sessions. Ca1 commented that this pupil was unable to work independently at the start of the trial but she felt that adult support could now be withdrawn.

In school 2 ca2 was timetabled to support the three P4 pupils when they used the program but after a few sessions of initial input she felt able to withdraw and allow the pupils to work independently. Ca3 also indicated that she was only needed for the first few sessions.

In school 4 the support system was less flexible and the Lexion intervention was incorporated into the school's current support for learning plan. This meant that classroom assistant time was allocated to each of the users for the whole trial period. Ca4 indicated that one of the P3 pupils she supported needed constant support to access the program but she believed that the other pupil could and wanted to work independently. This observation was confirmed by the pupil interview. Ca5 commented that after the first couple of sessions she mostly assumed the role of adult supervision as the pupils were working independently. She did initiate some interaction with each pupil during the session, mainly talking about the activities completed and/or strategies employed.

4.3.6 Benefits identified by classroom assistants

- personal programme of activities
- concentration improves
- basic skills improve
- gives confidence
- could help a whole range of learners
- improvement can be seen in other class activities

4.3.7 Concerns identified by classroom assistants

Concerns could be divided into three categories: equipment, program content and management.

Equipment:	Lexion is a PC only application: the majority of computers available in these 4 schools are Apple Mac platform problems with school hardware : age, access, specification
Program content:	level of general knowledge required can be too difficult for some younger users some of the pictures / photographs are not recognised by users accent of voice prompt can cause occasional problems
Management:	time required if several pupils needed support need for timetable to control access and availability pupil use should be during class language time pupil use should be timetabled for mornings not afternoons

4.3.7 Training and Use of support time

The five respondents indicated that they would welcome further training in the program, highlighting the desire to know more about the range of options available within the program's user settings.

When considering the issue of time one respondent was conscious that supporting Lexion users impacted on other commitments but the other four agreed that such support was a valid use of their time, especially in the initial stages when the pupil is less confident about interacting with the program. One succinct comment summarises the responses:

“Our support is aimed at using different resources with pupils but this program has all the advantages in resources. We would tend to stick to one game at a time but the program gives greater variety.”

4.4 Management Perspective

These findings were based on questionnaire returns from one member of the management team in each of the four schools. The e-mail responses received were detailed and each provided a list of identified benefits and concerns. These lists were

subjected to a content analysis to help identify categories which could be used to collate the responses.

4.4.1 Benefits identified

These could be divided into three categories: staff, pupils, school.

Staff : useful assessment tool
 structured individualised work programs for pupils
 activities can be adapted to offer greater support or challenge
 activities can be adapted to suit learning styles
 useful supplement to class work
 helpful pupil progress reports available

Pupils: individual work program to develop key skills
 instant feedback available on current progress
 increased confidence
 good motivator
 can suggest what activities they would like to do
 can suggest how they would like activities altered
 wide variety of activities available
 flexibility of tasks
 skills transfer
 independent access

School: resource to support learning at every primary stage

4.4.2 Concerns identified

The concerns and issues expressed could be divided into four categories: equipment, staff, time and software.

Equipment: Lexion is a PC application and the primary schools in the authority generally use Apple platform for pupil use

Staff: training required to access key features of program
 administration of the program needs to be designated
 deployment of support staff may be required

Time: timetabling of equipment and staff
 monitoring of pupil use and progress
 maintenance of equipment and program files

Software: cost of additional licenses for Lexion
 all schools currently use and have experience of Successmaker
 how to incorporate Lexion into curriculum

Chapter 5 **Discussion of Findings related to Research Questions**

5.1 Which aspects of the pupils' learning are supported by the software?

All of the pupils involved in the trial indicated that Lexion had helped them. It was not unexpected that some pupils might identify improvements in some area of literacy skills, given the time allocated. However, it was interesting to note some pupil recognition of how the program also affected their listening, concentration and thinking skills and had a wider impact on other work done in class.

The eight class teachers had indicated a range of concerns about each pupil's current attainment before the trial. These included a range of literacy features and a number of affective features. At the end of the trial period seven of the eight class teachers could not only identify, but believed they could provide evidence to support their claims that the program had had a positive impact on the pupil users' attainment in at least one area. The areas of greatest identified change were in self-esteem, phonological awareness, decoding, attentiveness and motivation. It was noted that both cognitive and affective areas were identified for some pupils.

The teachers of pupils a, g and h in particular noted that the impact had been greater and they had seen an overall improvement in pupil attainment which transferred to other areas of the curriculum. It was interesting to note that some of the teachers indicated improvements in areas where they had not expressed concerns initially. The teacher who did not identify any improvements qualified this response with a follow up statement where she explained that the deteriorating behaviour of the two individuals in her class was part of a wider discipline issue within the class. Consequently, pupil use of the program had been limited as a result of alternative strategies which had been introduced to modify group behaviour.

The classroom assistants also indicated that self esteem and motivation improved as well as basic skills for most of the supported users.

5.2 What benefits are recognised by pupils and staff?

All of the pupils thought that they had benefited from using the program and each of them was able to identify at least one aspect of literacy where they felt they had improved. Furthermore, they shared a collective belief that other pupils could benefit from and would enjoy using Lexion. Key ideas from the pupils included the element of challenge within the program, the fun aspect and the pace of the activities.

The eight class teachers shared the view that Lexion provided appropriate activities to support individuals with literacy difficulties. However, all of the teachers agreed

that their own knowledge of the program was limited. The teachers also liked the program's diagnostic assessment feature and the information generated was seen as useful for both planning and reporting.

Several teachers felt that a key benefit was that their pupil users had a certain level of independence while using the program and this was helping to build up their self confidence as well as reinforcing basic skills.

The classroom assistants reported that the individualised work program was a key benefit and that they could identify lots of other pupils who might benefit from similar intervention.

The school management respondents identified the potential impact of the program's flexibility and its practical application as a whole school learning resource. There was also recognition of the importance of the assessment function and the motivational aspect inherent in giving pupils some choice and control over their own learning activities by using the customisation features offered within the program.

5.3 What concerns are expressed by pupils and staff?

Twelve pupils, although asked directly about concerns, did not have any negative comments about the Lexion program. However, two pupils expressed similar concerns about missing other class work when using Lexion. This raises a key point about individualised learning and the need to involve pupils in decisions about their work programme when it differs from others. Another pupil expressed the desire to work with the program without an adult supervisor.

The teachers expressed no concerns about the software, possibly as a consequence of their limited knowledge of the program itself. However, four respondents identified the lack of training for teachers and time to become familiar with the program as areas of concern. General concerns related to access to suitable hardware within the classroom to counter the need for pupils to be extracted to work on the program.

The classroom assistants, who had more knowledge of the program, identified several issues. The most important of these was the recognition that the level of activity initially presented was not always suitable for the user and that some of the graphics were not easily identified by some pupils. Other concerns expressed related to the amount of time required if several pupils had to be supported using the program and the impact this might have on their opportunities to support other pupils. However, it was agreed that almost all of the pupils could work with the program independently following initial adult input on two or three occasions.

The management respondents did not identify any concerns about the software itself but raised a number of concerns relating to its practical application and its

incorporation as a curricular resource with significant management implications. Many of these points will be included in the discussion of issues to be addressed.

5.4 Which issues need to be addressed if the initiative is to be expanded successfully?

The first issue relates to the management of pupil activities within the Lexion program, as it does not automatically increase the level of challenge for users when they have made progress. This is a deliberate decision taken by the developers who believe that if a software program automatically upgrades then it is possible that the user has learned how to manipulate the program but has not necessarily consolidated the skills being developed. Consequently, when using Lexion, pupils can only be moved on to a more challenging level once a teacher judges that it is appropriate. This has to be done manually. However, it takes time and knowledge of the program to make suitable alterations.

Therefore, staff training will be a major factor in the successful development of this initiative. This will require the agreement of the LA education manager following a proposal from the microtechnology team's principal teacher. Awareness raising activities could be organised to provide an initial introduction to the flexibility and complexity of the program. This could be the precursor to dedicated training sessions. Access to the program itself to allow those teachers who are interested in exploring it would be useful, although the major issue here would be the time required and the availability of suitable hardware.

This leads to acknowledgement of some of the technical issues raised by recommending a piece of software which only runs on PC in an LA where most of the hardware in primary schools is Apple Mac. Fortunately, many of the schools have access to at least one PC and the newly acquired Intel macs can be converted to dual platform by the installation of Windows. However, in the current primary school environment there will be a limited number of computers available to run this program, meaning that many pupil users will continue to be extracted from class to work with it.

Additional staff related issues apply to the monitoring of the program and this is a decision for individual school management teams. If the potential benefits of the program are recognized, then difficult decisions might have to be made regarding the deployment of support staff and the designation of responsibility for monitoring pupil use and progress. Although the software trial was undertaken in four primary schools, the program also offers opportunities for older age groups and some secondary pupils might benefit from access to Lexion. Again, the management of the program would need careful consideration, although the use of mini-lexion would allow pupils to work at home if they chose.

Within our team a number of issues become apparent if the initiative expands. Further exploration of the curriculum development features within Lexion would be required to ensure a fuller knowledge of the program's scope. Training courses and support materials to enable participants to assess, generate and customise activities would need to be developed. If an awareness raising exercise was agreed then a presentation and other support materials would be required to give an overview of the program's main features and its three main tools within the classroom : to support individuals with literacy difficulties, to create suites of age appropriate language activities and to select individual activities to support particular teaching points.

5.4 Links to literature search

The findings of the research offer some support for Schofield's (1995) claim that ICT is a source of challenge and motivation and a promoter of self-confidence. The concerns expressed by staff and management about the Lexion initiative displayed marked similarities to those outlined by Van Dusen & Worthen,(1993) and (Parr,) when considering key factors identified in the successful implementation and management of ILS systems.

Additionally, it was noted that Lexion offers some opportunities to accommodate pupils' preferences and according to Gray et al, 1999; and Southworth et al, 1999) this could lead to improved performance. There is also the opportunity for pupils to control the amount of time spent on activities which Kemp (1997) claimed could result in higher achievement and better attitudes towards learning. All of the pupils in the study had been consulted about their preferences and settings when the activities were generated and this may have been a factor in some of their positive responses towards the program.

Chapter 6

Conclusion and Recommendations

6.1 Evaluation of limitations of study

As only fourteen pupils and four schools were involved in this study over a fairly short time scale, there is no claim that the findings can be generalised. However, data was gathered from a range of sources, pupils, class teachers, classroom assistants and school management representatives, in an effort to offer a degree of triangulation. The research also focused on individuals with literacy difficulties and the assessment and intervention features within the program. It did not engage with other facets of the program.

The relatively short time scale and the unreliability of some of the hardware precluded the collection of meaningful quantitative data from the program and from pupil's overall improvement in reading ability. Although each pupil was initially tested using the British Ability Scale reading test and the results collected, the gap between tests would have been too short to indicate true progress. However, it is intended that a further study will be undertaken and quantitative data will be gathered in an attempt to offer some more detailed account of progress in skill development.

6.2 Recommendations

Initially this program seemed to have potential for our service. However, it seems to have wider appeal and many of the teachers who have seen it seem to have different ideas not only about how they could use it but also about which pupils might benefit. Our recommendation for the local authority is that one Lexion pack should be made available to all schools.

6.2.1 Recommendations for teachers

If this program is to be a useful and effective tool then time will be required to become competent and confident with its use following a formal training course. Decisions will have to be taken about how to integrate Lexion use into the curriculum so that pupils can be engaged in their own learning pathways and not feel excluded when following such an individualised approach.

6.2.2 Recommendations for school management

If the program is to be implemented successfully then appropriate hardware must be made available. Decisions need to be taken about staff deployment to monitor and support the program's users. As Lexion has the potential to support learning in

different ways, staff development opportunities should be made available. Finally, the program's use could be incorporated into the school's development plan.

6.3 Further developments within our service

One of the key issues for us will be to plan and provide adequate and appropriate training for staff if the program is to realise its potential to support learning. This will involve organising awareness raising exercises and offering training sessions. Technical support for installation and customisation will also need to be made available. Another challenge will be to begin to generate content more closely matched to the Scottish curriculum and to the local authority learning initiatives.

6.4 Opportunities for further study

This particular study was short term but it is hoped that there will be opportunities for further study once Lexion is made available to all schools. It will be interesting to discover how the program is used in different settings and to collect quantitative data relating to pupil progress over a longer time span.

6.5 Final Thoughts

It is important to recognise that Lexion is an extremely flexible resource offering a wide range of opportunities to support and enhance teaching and learning. Assessment and intervention for pupils with language and literacy difficulties is only one aspect of this software. Lexion also provides access to age appropriate activities to support general literacy skill development. This allows for the creation of suites of activities to support school learning stages. Additionally, it gives class teachers access to a useful interactive teaching tool to support particular teaching points. Finally, the program also offers the facility to customise all of its activities, offering opportunities to develop specific curricular support. The potential of this program seems so vast that Hawkrige & Vincent's reminder is a particularly apt warning when considering this software:

“Computers can ease learning difficulties. They can help learners overcome difficulties.

They cannot work magic.” (1992)

Finally, it is important to realise that the further development of this initiative will only be successful when teachers engage directly with what the software has to offer. If class teachers identify and recognise pedagogical benefits and develop competence in the program's use, then this could offer them not only a strategic tool and set of resources to support learning but also an opportunity for professional development.

Bibliography

Books and Articles

- Baker, T. L. (1988) *Doing Social Research*. New York: McGraw Hill.
- Brooks, G. (2002) *What Works for Children with Literacy Difficulties?* National Foundation for Educational Research Report 380. Department for Education and Skills
- Bryman, A. (1989) *Research Methods and Organisational Studies*. London: Unwin Hyman.
- Bruner, J. (1987). *Making sense: the child's construction of the world*. London: Routledge.
- Chandler, P. (1995) *Is conventional computer instruction ineffective for learning?* Paper presented at the Australian Computers in Education Conference, Perth, 9-13 January
- Chen, H.T. (1996) A Complete Typology for Program Evaluation. *Evaluative Practice* 17 (2) 121-130
- Collins, J., Hammond, M. and Wellington, J. (1997). *Teaching and Learning with Multimedia*. London: Routledge
- Drever, E. (1995) *Using Semi-Structured Interviews in Small Scale Research*. Edinburgh, SCRE.
- Evans, R. (1973). *Jean Piaget: The Man and His Ideas*. New York: E. P. Dutton & Co., Inc.
- Flavell, J. (1985). *Cognitive Development*. New Jersey: Prentice Hall.
- Fullan, M. (1982). *The Meaning of Educational Change*. New York: Columbia University Press
- Gardiner, H. (1983). *Frames of Mind: the Theory of Multiple Intelligences*. New York: Basic Books.
- Gillham, B. (2000) *Developing a Questionnaire*. London: Continuum.
- Gillham, B. (2000) *The Research Interview*. London: Continuum
- Gray, J., Hopkins, D., Reynolds, D., Farrell, S. & Jesson, D. (1999) *Improving Schools: Performance and Potential*. Buckingham: Open University Press.
- Grusky, O. (1963) Managerial Succession and Organisational Effectiveness. *American Journal of Sociology* (69) p21-31
- Hart, S. (1996). *Beyond Special Needs*. London
- Hartley, J. (1998) *Learning and Studying: a research perspective*. London. Routledge.
- Hay, I., Elias, G., and Booker, G., (2005) Schooling Issues Digest - Students with Learning Difficulties in Relation to Literacy and Numeracy
- Humes, W. (1999) Policy Making in Scottish Education in: Bryce, T.G.K. & Humes, W.M. (eds) *Scottish Education*. Edinburgh: Edinburgh University Press.
- Hurry, J. (1996). 'Literacy programmes - how can we choose?' *The Primary English Magazine*, September/October, 24-6.
- Kyriacou, C. (2001). *Effective Teaching in Schools*. Cheltenham: Nelson Thornes.

- Leask, M. & Pachler, N. (Eds) *Learning to Teach Using ICT in the Secondary School*. London: Routledge.
- Lepper, M. R. (1988). Motivational Considerations in the Study of Instruction, *Cognition and Instruction* 5, 4 289-309.
- Lewis, A. (1999). 'Integrated Learning Systems and pupils with low attainments in reading.' *British Journal of Special Education*, 26, 3, 153-7.
- Munn, P. (2000) Research and Practice In T.G.K. Bryce & W.M. Humes (eds.). *Scottish Education*. Edinburgh: Edinburgh University Press.
- Peer, L. and G. Reid (Eds.) (2000) *Multilingualism, Literacy and Dyslexia: A Challenge for Educators*. London: David Fulton
- Pollard, A. (2002). *Reflective Teaching: Effective and Evidence-informed Professional Practice*. London: Continuum.
- Schofield, J. W. (1995). *Computers and Classroom Culture*. Cambridge: Cambridge University Press.
- Scrimshaw, P. (1997). Computers and the Teacher's Role. In Somekh, B. and Davis, N. *Using Information Technology Effectively in Teaching and Learning*. London: Routledge
- Smith, A. (1996) *Accelerated Learning in the Classroom*. Stafford: Network Educational Press Ltd.
- Solity, J. (1992). *Special Education*. London: Cassell Education Ltd
- Stark, R., Robertson, J. & Napuk, A. (1999) The Assessment of Achievement Programme. In Bryce, T.G.K. & Humes, W.M. (Eds.), *Scottish Education*. Edinburgh: Edinburgh University Press.
- Underwood, Jean (2000) A comparison of two types of computer support for reading development. *Journal of Research in Reading*. 23 (2), 136-148.
- Van Dusen, L. M., & Worthen, B. R. (1993). Factors that facilitate or impede implementation of integrated learning systems. In G. Bailey (Ed.), *Computer-based integrated learning systems*. Englewood Cliffs, NJ: Educational Technology Publications
- Vygotsky, L. (1962) *Thought and Language*. Cambridge, Mass.: MIT Press.
- Watson, J. (1996). *Reflection Through Interaction*. London: Falmer Press.

A review of the literature on computer-assisted learning, particularly integrated learning systems, and outcomes with respect to literacy and numeracy
 Report to the Ministry of Education
 Prepared by Judy M. Parr (with assistance from Irene Fung)
 School of Education
 The University of Auckland

Classroom Assistants' Interview Schedule

1. **Experience of the program**
How much did you know about the Lexion when you started to support pupils who were using it? How comfortable did you feel at the beginning?
2. **Experience with pupils using the program**
How many pupils did you support? How often? How long?
3. **Observations about pupil motivation**
Can you comment on how pupils reacted to using the program? Any changes noted over time?
4. **Observations about pupil performance**
Can you comment on how the pupils coped with the activities offered?
5. **Level of support required by pupils**
Do pupil users need constant adult support or can support be withdrawn gradually?
6. **Level of support offered to pupils**
Can you describe your level of input when supporting a Lexion user?
7. **Benefits**
Can you think of any benefits from the use of this program?
8. **Concerns**
Can you identify any problems or issues with the use of this program?
9. **Training**
Would you welcome further training in Lexion? Why/ why not?
10. **Time**
Do you consider supporting pupils using this program an appropriate use of your time? Why / why not?

Any other comments you wish to make?

Lexion

Thank you for agreeing to talk to me about your involvement with pupils using Lexion and allowing me to note your responses.

I have a few questions to ask and would welcome your ideas and opinions but I am willing to hear any other comments you wish to make.

Please be assured that all responses will be treated confidentially. No attempt will be made in the final written report to identify any school or individual.

Mary Donald (ASN/ICT Support)

Questionnaire for Class Teachers

Section 1 asks for some background information about pupil(s) in your class using Lexion

Section 2 asks for your perceptions of how the pupil(s) have responded to Lexion

Section 3 asks you to consider any benefits, concerns or issues you noted about the use of Lexion

Section 1

1. Stage currently taught P _____

2. Number of pupils referred for Lexion assessment ____

3. Please tick all the areas of concern you had about the pupil(s)

Area of Concern	Pupil 1	Pupil 2	Pupil 3
Decoding			
Spelling			
Writing			
Phonological Awareness			
Comprehension			
Memory			
Communication			
Attentiveness			
Motivation			
Behaviour			
Self esteem			
Other (please specify)			

4. National Test levels of pupil(s) on 8th January 2007

	Pupil 1	Pupil 2	Pupil 3
Reading			
Writing			
Maths			

5. Please indicate if pupil(s) received any additional support input

	Pupil 1	Pupil 2	Pupil 3
SFL Teacher			
SEN Auxiliary			
Classroom Assisitant			
Speech + Lang Therapist			
Successmaker Software			
Other (please specify)			

6. Current National Test levels of pupil(s) on 31st May 2007

3	Pupil 1	Pupil 2	Pupil

Reading

Writing

Maths

Section 2

1. Please tick any area where you have seen evidence of improvement for the pupil(s) since using Lexion

Evidence of improvement 3	Pupil 1	Pupil 2	Pupil
Decoding			
Spelling			
Writing			
Phonological Awareness			
Comprehension			
Memory			
Communication			
Attentiveness			
Motivation			
Behaviour			
Self esteem			
Other (please specify)			

2. How would you describe pupil reaction to using this program and if it changed over time what changes did you notice?

Section 3

1. What do you know about Lexion?

2. What benefits are there for class teachers from the use of Lexion?

3. What concerns do you have about this program being used by your pupils?

4. Would you find training in the use of this program helpful or an added pressure?

5. Additional thoughts welcomed

**Many thanks for your help. Please be assured that all responses will be treated in confidence.
No attempt will be made in the final report to identify any school or individual.**

Date _____

Dear Parent,

I am an ASN/ICT Support Teacher in North Lanarkshire.

I have recommended the use of Lexion with your child. This is a new software program which we hope will help a lot of pupils.

I would like your permission to use some of the information I will get about your child and their progress in a report I will be writing as part of my submission for chartered teacher status. The school will not be named and your child will not be identified.

If you agree please sign the tear off slip and return it to the school.

Thank you,
Mary Donald

I am happy for the information to be used.
I know that my child will not be named.

Signed:

Date:

